INFORMATION SHEET FOR THE FY2020
NOAA/OAR/OWAQ *VORTEX-SE* COMPETITION

General program priorities for interdisciplinary studies and transition to the Weather Enterprise

VORTEX-SE is a research program intended to improve tornado forecasts and warnings in the southeastern U.S. This will be achieved through examination of historical data, special datasets collected in the field as supported by VORTEX-SE, and the application of state-of-the-art numerical weather prediction and data assimilation systems. Further, VORTEX-SE will explore avenues for more effectively communicating tornado forecasts to the public, and evaluate aspects of public vulnerability, risk perception and response to these forecasts in order to more effectively mitigate damage, injuries, and loss of life from tornadoes.

Investigators should understand that VORTEX-SE is a program that is intended to have the maximum possible near-term societal benefit by reducing the impacts of tornadoes in the Southeast U.S. In preparing and reviewing proposals, investigators and reviewers should assess the viability of moving results expeditiously toward application. This perspective should serve to inform investigators of the applicability of their proposal to a NOAA grant competition, in contrast with funding programs of other agencies such as the National Science Foundation. Basic research is not excluded in VORTEX-SE, but proposals for basic research carry a certain burden of convincing reviewers of a likely path toward application. The funding opportunity announcement gives an example of Readiness Levels, and these should serve to give investigators a sense of how new knowledge can advance toward application in NOAA. VORTEX-SE knowledge may follow other paths, giving societal benefit through education of participants in the Weather Enterprise, insights into urban planning or codes, and a variety of diverse routes. Regardless of the exact route for transition, investigators should always consider how to advance their findings to application and positive societal impact beyond publishing and hoping that the new knowledge is "somehow" implemented.

In the past, VORTEX-SE has used several mechanisms to encourage interdisciplinary studies. The spectrum of approaches that are appropriate for VORTEX-SE-supported projects range from very narrow single-discipline efforts, to efforts that can only effectively proceed when they involve more than one discipline. The latter typically are more costly, often involving two or more principal investigators. Investigators need to be aware that reviewers will scrutinize the proposed budgets. Single-discipline proposals are not expected to generally cost near the grant limit ($400,000/project), while necessary inter- discipline collaboration may more easily justify budgets near the grant limit. In past competitions, VORTEX-SE has limited single-discipline proposals to $300,000/project, and many worthy proposals have been received that fit within that constraint.

In this competition, we do not specify any required discipline areas for individual proposals. The mix of disciplines should be that which best facilitates the research goals.

Collaboration with elements of the Weather Enterprise

Past competitions have encouraged investigators to form collaborations with the Weather Enterprise, especially the NWS. Indeed, the first proposal review criterion (30 points weight) continues to be an assessment of the relevance to the Weather Enterprise, including NOAA. The general result from the past has been the inclusion of letters of endorsement in proposals, but often only weak collaborative efforts have ensued. In this competition, we *discourage the practice of including letters of endorsement*. On the other hand, we wish to encourage actual collaborations with the Weather Enterprise where possible and useful. Hence, it will be a strength if proposals include an investigator(s) engaged in the operational aspects of the Weather Enterprise, and show a *substantive role* for that investigator(s) in the conduct of the project.

Definition of the Southeast

For purposes of this competition, the "Southeast U.S." is considered to be a region of enhanced threat of tornado mortality that owes to a combination of meteorological and socioeconomic factors. This region includes mainly the states of Arkansas, Louisiana, Mississippi, Tennessee, Kentucky, Alabama, and Georgia.

Elaboration of Science Emphases

This section supplements the brief descriptions of program priorities from the funding opportunity announcement.

In general, forecasting for VORTEX-SE observing campaigns has proven very difficult, perhaps mirroring general difficulties in tornado forecasting in this region compared to others. Difficulties span the time scales from minutes to days. The meteorological emphases in this funding opportunity are motivated by these problems. In the 2020 competition, we are strongly encouraging researchers to utilize the large amount of data that have been collected in previous VORTEX-SE observing campaigns.

This competition will *not* support the collection of any *new* field observations. Researchers are strongly encouraged to utilize the existing VORTEX-SE data sets for new projects. Applications to this competition that propose collection of new field observations will be rejected and not reviewed. The VORTEX-SE Scientific Steering Committee is collaborating with outside scientists to design a major field campaign, possibly involving multiple agencies, to be executed no earlier than the 2021-22 Southeast cool season, currently dubbed the Non-Classic Tornadic Storms (NCTS) experiment. Any

special *observations* prior to this campaign, for the purposes of risk reduction and/or demonstration, will be supported *outside* of this NOFO grant competition.

The NCTS experiment planners are exploring the idea that a relatively dense observing network should be deployed in an appropriate ~ 100x100 km "subregion" prior to the passage of each weather system with the potential to produce tornadoes. Roughly 8-10 one-day campaigns could be anticipated during a typical November-May cool season. Five subregions are being assessed. The subregion chosen for each deployment would depend on the forecasted storm morphology and severity combined with the needed observing emphases. Hence this Funding Opportunity has a somewhat refocused emphasis on studies that will improve the scientific effectiveness of the NCTS field campaign. Although results from grants awarded through this competition may only be preliminary when NCTS is planned and executed, the results are likely to improve the NCTS experiment and provide new knowledge that is broadly useful to VORTEX-SE.

VORTEX-SE seeks to encourage new research related to sheltering and vulnerability, perhaps spanning more than one emphasis area and involving more than one academic discipline, possibly including disciplines such as engineering. In particular, a better understanding of methods to reduce structural vulnerability in common residential structures in the Southeast (e.g., mobile homes, manufactured homes, slab construction), vulnerability of structures to the local environment and wind- driven debris, and better sheltering advice for residents in all types of structures, environments, and tornadoes is desired. Studies that assess the utility of improved messaging in the time and space scales between warnings and watches are especially encouraged.

Data management and availability

Proposals to this VORTEX-SE competition should rely on data that are currently freely available, and/or data the principal investigators will collect themselves or with formal co-investigators without requested NOAA funding through this Funding Opportunity. VORTEX- SE researchers are strongly encouraged to use existing VORTEX-SE data which are available in the catalogs maintained by UCAR's Earth Observing Laboratory (http://data.eol.ucar.edu/, search for "VORTEX-SE"). One example of this approach would be to use the archive of ~ 2000 soundings obtained in Meso18-19 in studies focused on Objective VORTEX-SE-2. This archive satisfies NOAA data management requirements and provides for a single distribution point for VORTEX- SE data.

Invitation to become involved

VORTEX-SE will increasingly be using an online Community Forum (https://vlab.ncep.noaa.gov/web/vortexse) to provide information to the research community and Weather Enterprise regarding emerging results and perceptions of needed new research across the spectrum of physical, social, behavioral, economic, and engineering sciences. We encourage anyone in the

community who is concerned about the meteorological and societal challenges of Southeast U.S. tornadoes to join the conversation on the Community Forum.